Space Weather Forecast

Issued on Thursday, 20 January 2022 at 01:01 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Slight chance G1/Minor Storm intervals from CME arrivals.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Very Low with no notable flare activity from the five sunspot regions on the visible disc. These regions are all relatively small, with simple magnetic fields, An Earth-directed coronal mass ejection (CME) was observed in the last 24 hours. This was due to a filament lift, which when a line of magnetic material that is held above the Sun's surface by its magnetic field is able to escape into the solar system.

Solar Wind / Geomagnetic Activity: The solar wind was strong at first, with speeds reaching around 680km/s, and a moderate magnetic field strength. This included a period of moderately strong southward pointed field, in the important north-south component. This was due to a weak CME arriving, whilst the Earth was still within the faster solar winds from a coronal hole. This CME likely left the Sun on the 15th and the combined effect of this and the faster winds led to a G2 Moderate geomagnetic storm occurring 19/0000-0300 and then a G1/Minor geomagnetic storm 19/0300-0600. Solar winds then eased to be elevated by the end of the period, with only weak magnetic field strength, and only Quiet to Unsettled geomagnetic activity.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms having occurred.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Very Low with only a slight chance of Moderate-flares from any of the sunspots on the Earth-facing disc. This risk reduces further by day 3 (22nd) with a couple of these sunspots rotating off the Earth-facing disk.

Solar Wind / Geomagnetic Activity: There are three potential CME arrivals through the period. There is a slight chance of a glancing impact early day 1 (20th) from a CME which left the Sun on the 16th, and a glancing impact is also possible either late day 2 (21st) or early day 3 (22nd) from a CME from the Moderate flare on the 19th. Both of these are low confidence with the bulk of the CME material missing, passing ahead and to the north of Earth. A further slower, and weak CME on the 19th has the potential to arrive day 4 (23rd), but confidence is low on impacts due to the slow CME speed along with background solar winds being forecast to gradually decline to ambient levels by this stage. Geomagnetic activity is forecast to be mostly Quiet to Unsettled with isolated Active intervals possible, but a slight chance of increasing Active to G1/Minor storm levels from any CME arrivals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no solar radiation storms occurring.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	10	20	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	10	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.